Databases - course description

General information

Course name	Databases
Course ID	13.2-WF-FizP-D-S17
Faculty	Faculty of Physics and Astronomy
Field of study	Physics
Education profile	academic
Level of studies	First-cycle studies leading to Bachelor's degree
Beginning semester	winter term 2018/2019

Course information

Semester	4
ECTS credits to win	3
Course type	obligatory
Teaching language	english
Author of syllabus	• dr Sebastian Żurek

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Laboratory	30	2	-	-	Credit with grade

Aim of the course

Course aims to introduce students with the open source tools and techniques of data analysis and data storage. Particular attention is paid to storing scientific data and constructing databases supporting scientific research.

Prerequisites

Basics in programming languages and programming

Scope

The course contents provides the basic knowledge on structure and workin schemes of SQL database systems. In praticular, the following problems will be discussed:

- Data model construction,

- Data relations: primary keys/foreign keys and the relations types (O2M, O2O, M2M),

- SQL introduction with the usage of open source SQL engines: PostgreSQL, MySQL,SQLite,

- Programmers interfaces to SQL engines (C++, Python, PHP),

- Object relational mapping (ORM),

- Databases in web applications: CMS,

- Non-SQL databases types.

Teaching methods

Computer lab, discussions, individual students readings of technical documentation and searching for information on the web.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Students know how to use the DB engines with the interfaces of programing languages like C++, Python or PHP		• a discussion • a project • an ongoing monitoring during classes	• Laboratory
Students are able to use Internet and other available technical manuals to extend their knowledge regarding the data storage (especially scientific data)		• a discussion • a project • an ongoing monitoring during classes	• Laboratory
Students know the possible applications of DBs in scientific research context		• a discussion • a project • an ongoing monitoring during classes	• Laboratory

Outcome description	Outcome symbols	Methods of verification	The class form
Students are able to install and administer popular and open-source DB engines available for Windows and Linux operating systems		• a discussion • a project • an ongoing monitoring during classes	• Laboratory

Assignment conditions

The condition for passing the laboratory is realization of two projects planned for implementation as part of the laboratory program and obtaining positive grades from reports describing projects:

- project of a database storing data on the scientific results of the unit's employees with a report prepared in the LaTex system (35% of the grade)
- project and implementation of a database that records the results of a multi-center research project
(data from experiments, analytical system, project management tools) with a report prepared in the LaTex system (65% of the grade)

Recommended reading

[1] Mark Whitehorn, Bill Marklyn, Relacyjne bazy danych, Helion 2003.
[2] A. Molinaro, SQL Cookbook , O'Reilly 2006.

Further reading

[1] PostgreSQL, MySQL, SQLite manuals and other technical docs.

Notes

Modified by dr hab. Piotr Lubiński, prof. UZ (last modification: 01-08-2018 15:10)

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